

Year 2016 Test Paper
Max Marks – 100

Date – 25 Aug 2017
Time:1.30 Mins

Q. 1. A book is kept vertically initially and then it is kept horizontally in the sand. In this case, which statement is false among the following?

- 1) The book will exert unequal force in both the situations.
- 2) Different pressure will be created in both the situations.
- 3) The book will exert equal force in both the situations.
- 4) The pressure created in vertical position of the book is greater than the pressure created in the horizontal position.

Q. 2. When an object is kept between two plane mirrors making certain angle, 5 images are formed. What is the measure of the angle between the two plane mirrors?

- 1) 72° 2) 90° 3) 120° 4) 60°

Q. 3. Which of the following physical quantities is useful to determine the purity of an element?

- 1) Mass 2) Volume 3) Density 4) Weight

Q. 4. The weight of an object on Mars is 348 N. Then what will be the mass of the-object?

- 1) 100 kg 2) 100 gm 3) 3.48 kg 4) 348 kg

Q. 5. What will be the power of an engine from the following, if it is working at the rate of 60 joule/min?

- 1) 60 watt 2) 10 watt 3) 0.1 watt 4) 1 watt

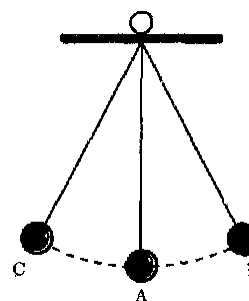
Q. 6. As shown in the diagram, the chargeless object Q is brought near the charged object P. Then determine which statement is correct from the following about the charge at points X and Y on an object Q.

- 1) Negative charge will create at point 'X' and positive charge at point 'Y'.
- 2) Positive charge will create at point 'X' and negative charge at point 'Y'.
- 3) Positive charge will create at point 'X' and no charge at point 'Y'.
- 4) No charge will create at points 'X' and 'Y'.

Q. 7. Among the following, which physical quantity has no unit?

- 1) Upthrust 2) Gravitation
3) Specific gravity 4) Density

Q. 8. In the adjoining diagram, the pendulum is in motion. What type of energy of pendulum at point 'A' is shown in the diagram?

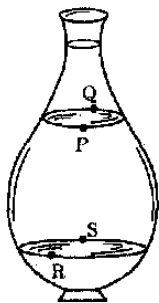


- 1) Only kinetic energy
- 2) Only potential energy
- 3) Both, kinetic and potential energy
- 4) Zero energy

Q. 9. The force of action and reaction do not nullify the effect of each other. In this case which statement is false from the following?

- 1) Both the forces are applied on the same object.
- 2) Both the forces are applied in opposite direction.
- 3) Both the forces are applied at the same time.
- 4) These forces are applied on different objects.

Q. 10. In the adjoining diagram, a pot is filled with water. P, Q, R and S are the points as shown in the diagram. About liquid pressure at P and Q which statement is correct from the following?



- 1) Liquid pressure at both points P and Q is equal.
- 2) Liquid pressure at points P and Q is different
- 3) Liquid pressure at points P and Q is greater than the pressure at point R.
- 4) Liquid pressure at point S is less than the pressure of liquid at points P and Q.

Q. 11. Which factor from the following remain constant while propagation of sound wave through the given medium?

- 1) Pressure of medium
- 2) Density of medium
- 3) Energy of particles of medium
- 4) Mass of particles of medium

Q. 12. Aquatic creatures in the polar region remain alive under water during the extreme

weather conditions in the winter season. Which mode of transmission of heat must be responsible

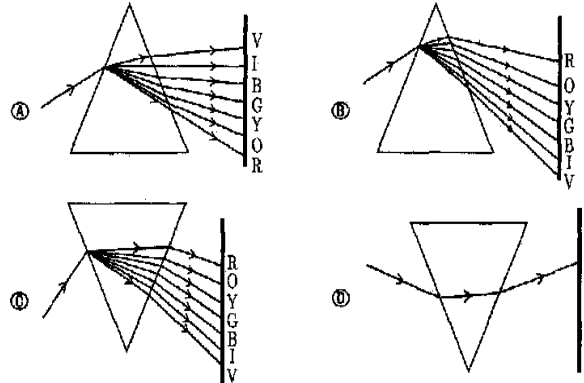
for this?

- 1) Conduction
- 2) Radiation
- 3) Convection
- 4) All of all above

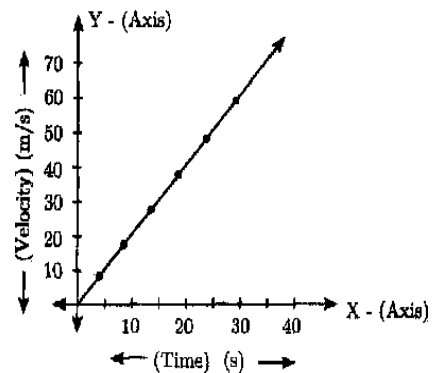
Q. 13. The construction of submarine is based on
1) law of gravitation 2) law of inertia

3) Pascal's law 4) Archimedes' principle

Q. 14. Identify the diagram showing the correct way of light ray passing through a prism?



Q. 15. The 'Velocity — Time' graph of an object in motion is given below. Observe it carefully and determine the acceleration of the object.



- Ⓐ 2 m/s^2 Ⓑ 1 m/s^2 Ⓒ -2 m/s^2 Ⓓ -1 m/s^2

Q. 16. Two substances having equal mass and different velocities collide with each other. Determine the correct equation related to conservation of momentum.

1) $u_1 + v_1 = u_2 + v_2$ 2) $u_1 - v_1 = v_2 - u_2$

4) $u_1 - v_1 = u_2 - v_2$ 4) $mu_1 - mu_2 = mv_1 + mv_2$

Q. 17. In which range of age, human being can hear sound upto 25,000 Hz from the following?

- 1) 1 to 4 years 2) 10 to 50 years

2) 60 to 90 years
years

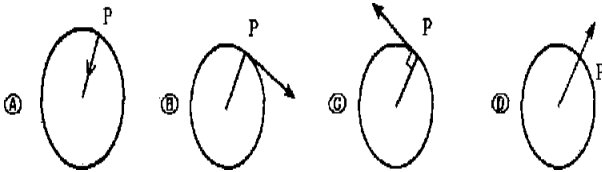
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4) 90 to 100

Q. 18. In which pair, units of given physical quantities are different?

- 1) speed, velocity 2) energy, work
3) density, volume 4) weight, force

Q. 19. The object P is in circular motion. Choose the correct diagram showing the direction of the motion of an object P from given below.



Q. 20. The frequency of the soundwave is 500 Hz and speed of sound is 125 m/s. Find the wavelength of the soundwave.

- 1) 0.25 m 2) 2.5 m 3) 4m 4) 25 m

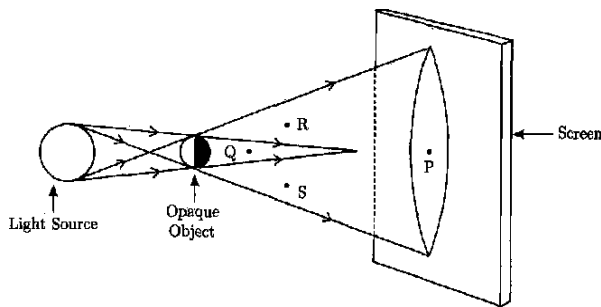
Q. 21. The mass of object X is M and that of object Y is M_2 . Keeping their kinetic energy constant, if the velocity of object Y is doubled the velocity of object X, what will be the relation between their masses?

- 1) $M_1 = 2M_2$ 2) $4M_1 = M_2$
3) $M_1 = 4M_2$ 4) $2M_1 = M_2$

Q. 22. A boy standing at a distance of 172.5 m from the base of a tower shouted 'hello'. After what time the boy can hear the echo, if the speed of sound is 345 m/s.

- 1) 0.5 s. 2) 1 s 3) 1.5 s. 4) 2 s.

Q. 23. What will be your correct observation from the following if you see towards the object from the points P, Q, R and S shown in the given diagram?



- 1) The full Source can be seen from point P
2) The source cannot be seen from point Q

- 3) From the point R, the source cannot be seen
4) Full source can be seen from point S

Q. 24. Determine the correct group of magnetic substances from the following:

- 1) Cobalt 2) Steel 3) Manganese 4) Nickel
1, 3, 4 2) 2, 3, 4 3) 1, 2, 3 4) 1, 2, 4

Q. 25. A stone is released with acceleration 'a' from an upwardly moving left. Find out the acceleration and direction of the stone.

- 1) a in upward direction
2) $(g - a)$ in downward direction
3) $(g + a)$ in upward direction
4) g in downward direction

Q. 26. What does the moving charge create from the following?

- 1) Only an electric field 2) Only the magnetic field
3) Both 1) and 2) 4) An evacuated field

Q. 27. A car covers 5,000 m in 3 minutes. What will be its speed in km/hr?

- 1) 120 2) 100 3) 15 4) 30

Q. 28. A person of weight 60 units goes at the distance % times of the radius of the Earth towards the center (of the Earth). Determine the person's weight at that place from the following.

- 1) 60 units 2) 45 units 3) 30 units 4) 15 units

Q. 29. If a bar magnet is divided into two equal parts, what will be the effect on their magnetism?

- 1) Magnetism of each bar magnet will be twice of previous magnetism.
2) Magnetism will not change.
3) Magnetism will be half of the previous magnetism.
4) Magnetism will be $1/4$ times of the previous magnetism.

Q. 30. 5 cm x 3 cm x 2 cm. are the dimensions of a cuboidal block and its mass is 50 gm. The density of liquid in which it floats must of _____.

- 1) 1.5 gm/cm³ 2) 1.75 m/cm³
3) 1.3 gm/cm³ 4) 0.6 gm/cm³

Q. 31. Which of the following are not paired correctly?

- 1) Baking soda — Sodium Bicarbonate
- 2) Calamine — Zinc Carbonate
- 3) Slaked lime — Calcium oxide
- 3) Blue vitriol — Copper sulphate

Q. 32. The elements with atomic numbers 3, 11, 19, 37 and 55 are all termed as_____.

- 1) Noble metals 2) Alkali metals
- 3) Noble gases 4) Alkaline Earth metals

Q. 33. What changes will be observed if acetic acid is added to distilled water in a test tube and is shaken for a while?

- 1) A clear transparent colourless solution will be seen.
- 2) A clear transparent pink solution will be seen.
- 3) A precipitate setting at the bottom of the test tube.
- 4) Two distinct layers are seen.

Q. 34. A sample of an element Y contains two isotopes $^{16}_8Y$ and $^{18}_8Y$. If the average atomic mass of the element is 16.40, the ratio of the atoms would be how much?

- 1) 3:4 2) 1 : 4 3) 4:1 4) 4:3

Q. 35. What is the molecular mass of Na_2CO_3 ?

- 1) 52 u 2) 106 u 3) 128 u 4) 112 u

Q. 36. Which of the following elements are liquid at room temperature?

- 1) Mercury 2) Bromine 3) Gallium 4) Iodine

- 1) 1, 2, 3 2) 1, 2 3) 1, 2, 4 4) All of these

Q. 37. After burning magnesium ribbon in air, its residue is dissolved in water and blue and red litmus paper dipped into the liquid. What change will you observe?

- 1) Red litmus remains red and blue litmus turns red
- 2) Blue litmus remains blue and red litmus remains red

3) Blue litmus turns red and red litmus turns blue

4) Red litmus turns blue and blue litmus remains blue.

Q. 38. Which of the following metals does not possess variable valency?

- 1) Copper 2) Iron 3) Lead 4) Sodium

Q. 39. Which of the following pairs is incorrect¹?

- 1) Vinegar — Carbonic acid
- 2) Tamarind — Tartaric acid
- 3) Butter milk — Lactic acid
- 4) Lemon juice — Citric acid

Q. 40. How many molecules of glucose are present in 360 grm of glucose?

- 1) 1.2044×10^{24} 2) 6.022×10^{23}
- 3) 1.2044×10^{23} 4) 1.8066×10^{24}

Q. 41. A species 'X' contains 15 protons, 18 electrons and 16 neutrons. Identify the species 'X'.

- 1) A neutral atom 2) An anion
- 3) A cation 4) None of these

Q. 42. Which among the following has the strongest intermolecular force?

- 1) Carbon dioxide 2) Sodium carbonate
- 3) Bromine 4) Sodium chloride

Q. 43. The correct order of increasing number of protons is _____

- 1) K, I, Cl, Br, Ar 2) K, Cl, Br, I, Ar
- 3) Cl, Ar, K, Br, I 4) Ar, K, Cl, Br, I

Q. 44. If liquid mixture of air containing Krypton, Neon, Nitrogen and Oxygen is fractionally distilled. The order of gases distilling out will be

- 1) Krypton, Neon, Nitrogen, Oxygen
- 2) Neon, Nitrogen, Oxygen, Krypton
- 3) Nitrogen, Neon, Oxygen, Krypton
- 4) Oxygen, Neon, Nitrogen, Krypton

Q. 45. What is the chemical name of $\text{Na}_2\text{S}_2\text{O}_3$?

- 1) Sodium sulphate 2) Sodium bisulphate
3) Sodium sulphurous acid 4) Sodium thiosulphate

Q. 46. Which of the following gases are lighter than air?

Hydrogen, Carbon dioxide, Ammonia, Sulphur dioxide

- 1) Hydrogen, Carbon dioxide
2) Ammonia, Hydrogen
3) Hydrogen, Sulphur dioxide
4) Ammonia, Carbon dioxide

Q. 47. An element 'X' forms an oxide with formula X_2O_5 . What will be the formula of its chloride?

- 1) X_2Cl 2) X_5Cl_2 3) XCl_1 4) XCl

Q. 48. Electronic configurations of some elements are given below. Which element is most reactive among them?

- 1) (2, 8, 7) 2) (2, 8, 6) 3) (2, 7) 4) (2, 6)

Q. 49. Which of the following is the conversion of 113°F in the Kelvin scale?

- 1) 318 K 2) 386 K 3) 45 K 4) 273 K

Q. 50. Gun powder is the mixture of which of the following substances?

- 1) Sulphur, Potassium nitrate, Charcoal
2) Phosphorous, Potassium nitrate, Charcoal
3) Ammonium chloride, Potassium nitrate, Sulphur
4) Sulphur, Sodium nitrate, Charcoal

Q. 51. Which of the following substances make water hard?

- i) Sodium chloride ii) Sodium sulphate
iii) Calcium chloride iv) Calcium sulphate
v) Potassium chloride vi) Magnesium sulphate

- 1) i, ii, v 2) i, iii, v 3) iii, iv, vi 4) ii, iv, vi

Q. 52. On which factor, the rate of the evaporation doesn't depend?

- 1) Change in surface area

2) Change in temperature

3) Change in volume 4) Change in humidity

Q. 53. Choose the correct option to match group A and group B.

	Group A		Group B
i)	^{131}I	a)	Production of energy
ii)	^{235}U	b)	Treatment of cancer
iii)	^{60}Co	c)	Treatment of goiter

1) (i, c), (ii, a), (iii, b) 2) (i, b), (ii, c), (iii, a)

3) (i, b), (ii, a), (iii, c) 4) (i, a), (ii, c), (iii, b)

Q. 54. Which of the following is Buckminster fuller (Fullerene)?

- 1) An isomer of Carbon 2) An isotope of Carbon
3) An allotrope of Carbon
4) A functional group of Carbon

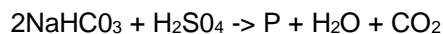
Q. 55. Which of the following substance is used as antacid?

- 1) NaCl 2) $\text{Mg}(\text{OH})_2$ 3) HCl 4) H_2SO_4

Q. 56. On which factor the strength of any acid depends?

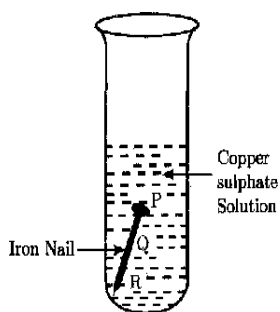
- 1) Density of the acid.
2) Number of Oxygen atoms present in it.
3) Number of Hydrogen atoms present in it.
4) Concentration of H^+ ions furnished by the acid.

Q. 57. Identify 'P' in the following balanced chemical reaction.



- 1) Na_2CO_3 2) Na_2SO_4 3) NaHSO_4 4) $\text{Na}(\text{SO}_4)_2$

Q. 58. Observe the figure and identify at which place on the nail, the deposition of copper will take place first.



- 1) At -point P 2) At point R
 3) At point Q 4) Any where on the surface of nail

Q. 59. Why do we pucker our lips when we blow a flame?

- 1) To increase the amount of CO₂ in the air passing out through mouth
 2) To increase the pressure on air passing out through mouth
 3) To increase the temperature of air passing out through mouth
 4) All of the above

Q. 60. Identify the chemical component present in chillies that makes them taste pungent?

- 1) Thiocyanate 2) Lacrimator
 3) Capsicin 4) Alkali amide

Q. 61. Identify the micro-nutrients from the followings.

- 1) Molybdenum and Boron
 2) Magnesium and Potassium
 3) Sulphur and Phosphorus
 4) Potassium and Carbon

Q. 62. pH of human blood is _____.

- 1) 7.3 to 7.4 2) 8.3 to 8.4
 3) 7.0 4) 6.3 to 6.4

Q. 63. Who is known as the father of 'White Revolution'?

- 1) Prof. Albert Kurien 2) Prof. William Kurien
 3) Prof. Verghese Kurien 4) Prof. Robert Brown

Q. 64. Find the odd one out on the basis of their solubility.

- 1) Vitamin C 2) Vitamin A
 3) Vitamin E 4) Vitamin K

Q. 65. Which of the following has three chambered heart?

- 1) Owl 2) Shark fish 3) Rat 4) Toad

Q. 66. Human Nervous System is divided into

- 1) C.N.S., P.N.S., A.N.S. 2) C.N.S., P.N.S.
 3) C.N.S, M.N.S., P.N.S. 4) C.N.S., A.N.S.

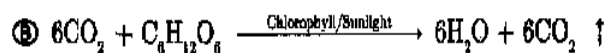
Q. 67. Which chemical makes the walls of cells of cork impermeable to gases and water?

- 1) Tanin 2) Auxins 3) Suberin 4) Gibberellin

Q. 68. Blood is an example of _____ m

- 1) epithelial tissue 2) merestematic tissue
 3) connective tissue 4) sclerenchyma tissue

Q. 69. Identify the correct equation of photosynthesis reaction.



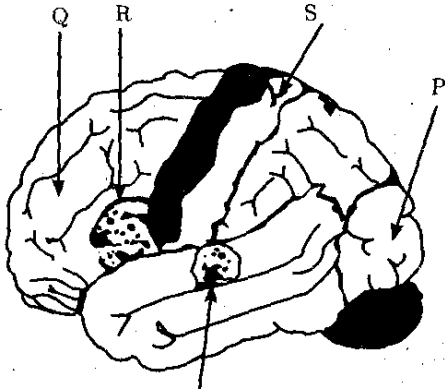
Q. 70. Cell of Mycoplasma galliseptium is an example of _____

- 1) smallest cell 2) thinnest cell
 3) longest cell 4) largest cell

Q. 71. On the basis of blooming criteria, select the odd one out.

- 1) Lotus 2) Hibiscus 3) Marigold 4) Tube-rose

Q. 72. Observe the figure of human brain and identify the vision and thought area.



1) P and Q 2) R and S 3) T and P 4) Q and R

Q. 73. Which of the following is connecting link of Phylum Annelida and Arthropoda?

1) Petromyzon 2) Balanoglossus
3) Peripatus 4) Ichthyophis

Q. 74. The shrinkage of cytoplasm in animal cell can take place if it is placed in _____.

1) hypertonic solution 2) isotonic solution
3) hypotonic solution 4) neutral solution

Q. 75. Who modified the classification of kingdom plantae by adding two subkingdom cryptogams and phanerogams?

1) Etcher 2) Johannes Purkinje
3) M. J. Schleiden 4) D. Fletcher

Q. 76. Nephridia is main excretory organ of

1) prawn 2) earthworm 3) scorpion 4) round worm

Q. 77. Lipids are produced in _____.

1) smooth endoplasmic reticulum 2) nucleus
3) ribosomes 4) rough endoplasmic reticulum

Q. 78. Identify the 'hermaphrodite' animal from the given alternatives.

1) Leech 2) Sea-Cucumber 3) Spider 4) Platypus

Q. 79. Human Immunodeficiency Virus attack the _____ in the human blood.

1) R.B.Cs 2) W.B.Cs 3) Platelets 4) Plasma

Q. 80. Who established 'Theory of Natural Selection'?

1) Lamarck 2) Darwin 3) Robert Hooke
4) Leeuwenhoek

Q. 81. Nephron is the structural and functional unit of _____.

1) brain 2) kidney 3) liver 4) testis

Q. 82. Which pair of diseases is not caused by fungus?

1) Rust and Ergot 2) Ergot and Leaf spot
3) Bunchy top and Wilt 4) Wilt and Rust

Q. 83. Wucheria belongs to Phylum _____; _____.

1) Echinodermata 2) Nematelminthes
3) Coelenterata 4) Arthropoda

Q. 84. Select the *correct* example of Division Pteridophyta.

1) Funaria 2) Marsilea 3) Riccia 4) Marchantia

Q. 85. Which of the following grass is not cultivated as a fodder?

1) Sudan 2) Rhodes 3) Barseem 4) Parthenium

Q. 86. Filariasis is _____.

1) an epidemic 2) a pandemic
3) an endemic disease 4) a chronic disease

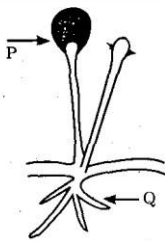
Q. 87. In which of the following pairs, the mode of reproduction is 'Binary Fission'.

1) Euglena, Paramecium 2) Hydra, Paramecium
3) Planaria, Hydra 4) Spirogyra, Amoeba

Q. 88. Insects have _____ and _____.

1) 2 wings, 4 appendages
2) 4 wings, 6 appendages
3) 2 wings, 6 appendages
4) 4 wings, 4 appendages

Q. 89. Observe the figure and select the *correct* label for P and Q



- 1) P - Stolon, Q - Columella
- 2) P - Rhizoid, Q - Stolon
- 3) P — Apophysis, Q — Rhizoid
- 4) P — Collarete, Q — Sporangiphore

Q. 90. Who belongs to both the classes of living things- plants and animals?

- 1) Hydra
- 2) Chara
- 3) Amoeba
- 4) Euglenaa

Q. 91. Which is the *sixth* state of matter, invented by scientists in Cambridge?

- 1) Quassy particles
- 2) Majerena fermion
- 3) Quantum spin liquid
- 4) Gold particles

Q. 92. This group of plants is used as 'Pollution Indicators' in cities and near industries, as they are more sensitive to air pollution.

- 1) Mango, *Panagra* (Indian Coral tree), Sunflower
- 2) *Saptaparni* (Indian devitree), *Chikoo*, Banyan
- 3) *Rui* (Calatropis), *Pipal*, Hibiscus
- 4) Money plant, Rubber plant, Casurina -'

Q. 93. INRSS-1 G '(an Indian satellite) is mainly going to be used for _____.

- 1) weather forecast
- 2) education
- 3) navigation
- 4) agriculture

Q. 94. For speedy transportation during organ transplantation, now-a-days, in "cities _____ is used.

- 1) helicopter
- 2) drone
- 3) ambulance
- 4) green condor system

Q. 95. GPRS is the abbreviation of _____.

- 1) Global Positioning Radio System
- 2) General Packet Radio Service
- 3) Global Packet Radio Service
- 4) General Positioning Radar System

Question numbers 96 to 100 are based on the paragraph given below and related general knowledge. Read the paragraph carefully and answer the questions.

The 'SWAYAM' satellite designed and built by students of the College of Engineering in Pune (COEP) is launched by ISRO from Sriharikota by polar satellite launch vehicle on 22nd June 2016 successfully. The cube shaped satellite has very low weight with height 10 centimeter. Building a picosatellite, assembling all the mechanism within 2 W power and to function these machineries with least energy usage. All these challenges were successfully tackled by the students. For this purpose 6 solar pannels were used, which will help recharge the Lithium battery again and again. With the help of a technique called Passive Magnetic Control, the orientation of satellite is controlled and stabilised in the orbit without any power

consumption. Receiving messages, storing them and transmitting them from one corner of the globe to the other is the main purpose of 'SWAYAM'.

Q. 96. By which vehicle the 'SWAYAM' satellite was launched?

- 1) PSLV - C30
- 2) PSLV - C34
- 3) PSLV - C23
- 4) PSLV - C35

Q. 97. What is the approximate weight and volume of 'SWAYAM' satellite?

- 1) 1 kg, 100 cc
- 2) 2.5 kg, 100 cc
- 3) 1 kg, 1000 cc
- 4) 2.5 kg, 1000 cc

Q. 98. What is the main purpose of 'SWAYAM' satellite?

- 1) To receive messages
- 2) To store messages
- 3) To transmit messages from one ground station to other.
- 4) All of the above

Q. 99. Together with 'SWAYAM' how many other satellites were launched by ISRO on 22nd June?

- 1) 20
- 2) 18
- 3) 2
- 4) 19

Q. 100. _____ is the orientation of Geo stationary satellite

- 1) In the plane of Earth's equator
- 2) In the plane of Earth's pole
- 3) None
- 4) In the plane of Earth's equator and pole

4) None of the above

Ans & Solutions

A.1. (A) Explanation: A book will exert unequal force in both the situations. Remaining three

alternatives are true

A.2 (D) Explanation: Angle between two plane mirrors-ft

Number of images of the object between two plane mirrors,

$$N = 5$$

Now

$$\therefore N = \frac{360^\circ}{\theta} - 1$$

$$\therefore 5 + 1 = \frac{360^\circ}{\theta}$$

$$\therefore 6 \times \theta = 360$$

$$\therefore \theta = \frac{360}{6}$$

$$\therefore \theta = 360^\circ$$

A.3. (C)

A.4. (A) Explanation:

Gravitation of Mars = 3.48 m/s²

Weight, W = mg (when m = mass)

$$\therefore 348 \frac{kg \ m}{s^2} = m \times \frac{348}{100} \ m/s^2$$

$$\frac{348 \times 100 \ kg \ m}{s^2} \times \frac{s^2}{m} =$$

$$\therefore 100kg = m$$

A.5. (D) Explanation:

$$1 \text{ watt} = 1 \frac{joule}{second}$$

$$power = 60 \frac{joule}{min \ ut}$$

$$power = \frac{60 \ joule}{second}$$

$$power = 1 \frac{60 \ sec \ ond \ joule}{second}$$

$$power = 1 \text{ watt}$$

\therefore Power of engine = 1 watt;
as 1 joule/second = 1 watt.

A.6. (A) Explanation: Negative charge will create at point X and positive charge at point Y.

A.7. (C) Explanation: Specific gravity is the ratio of two same gravities (densities).

A. 8. (A)

A.9. (A) Explanation: Both the forces are applied on the same object. Remaining three statements are true.

A.10. (A) Explanation: Liquid pressure at points P and Q is equal. Point P and Q are at the same level in given liquid.

A.11. (D) A.12. (C) A.13. (D) A.14. (B)

A.15. (A) Explanation:

$$t = 10s \quad v = 20m / s$$

$$t_2 = 30s \quad v_2 = 60m / s$$

$$a = \frac{v_2 - v_1}{t_2 - t_1}$$

$$\therefore a = \frac{60 - 20}{30 - 10}$$

$$\therefore a = \frac{40}{20}$$

$\therefore a = 2m/\sqrt{3}$ Trusted for Success

A.16. (B)

Explanation:

Before collision

Substance	Mass	Velocity	Momentum
A	m	u_1	mu_1
B	m	u_2	mu_2

and after collision

A	m	v_1	mv_1
B	m	v_2	mv_2

According to the law of conservation of momentum,

$$mu_1 + mu_2 = mv_1 + mv_2$$

$$\therefore u_1 + u_2 = v_1 + v_2$$

$$\therefore u_1 - v_1 = v_2 - u_2$$

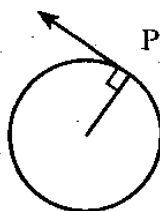
A.17. (A)

A.18. (C) Explanation:

	CGS	MKS
Density	g/cm^3	kg/m^3
Volume	cm^3	m^3

A.19. (C) Explanation: In circular, motion the

direction of the motion of an object is tangential as shown in figure



Speed of sound $v = 125 \text{ m/s}$

Frequency of sound $\nu = 500 \text{ Hz}$

Wavelength of the sound wave $\lambda = ?$

$$v = \nu \lambda$$

$$\therefore 125 = 500 \lambda$$

$$\therefore 125/500 = \lambda$$

$$\therefore \lambda =$$

$$\therefore 0.25 \text{ m} = \lambda$$

A.21. (C) Explanation:

Object	Mass	Velocity	Kinetic Energy
X	M_1	V	$M_1 V^2$
Y	M_2	$2V$	$M_2 (2V)^2$

Kinetic energy is constant

$$M_1 V^2 = M_2 (2V)^2$$

$$\therefore M_1 V^2 = M_2 4V^2$$

$$\therefore M_1 = 4M_2$$

A.22. (B) Explanation:

To hear the echo, the sound will have to travel the distance $= 2 \times 172.5 \text{ cm} = 345 \text{ m}$

$$\text{speed} = \frac{\text{distance}}{\text{time}}$$

$$\therefore 345 \text{ m/s} = \frac{345 \text{ m}}{t}$$

$$\therefore t = 1 \text{ s}$$

A.20. (A) Explanation:

A. 23. (B) **Explanation:** The light source cannot be seen from point Q. We cannot see the light source if we are in 'umbra' region.

A.24. (D) Explanation: Cobalt, steel and nickel are magnetic metals. Manganese is a non-magnetic metal.

A.25. (D) Explanation: Gravitational acceleration due to earth on any object is always in the downward direction.

A.26. (C)

A.27. (B) Explanation:

The car travels 5,000 m. in 3 minutes.

$$\text{Distance} = 5000 \text{ m} = \frac{5000}{1000} \text{ km} = 5 \text{ km}$$

$$\text{Time} = 3 \text{ min} = \frac{1}{20} \text{ hr}$$

$$\text{speed} = \frac{\text{distance}}{\text{time}} = \frac{5 \text{ km}}{1/20 \text{ hr}}$$

Speed of the car in km/hr = 100

A.28. (D) Explanation: The weight of an object towards the center of the Earth goes on decreasing while going away from the surface of the Earth. The weight of an object at a distance of r from the center of the Earth is $\frac{1}{r^2}$ times the weight at the surface.

The weight of an object at a distance of r from the center of the Earth after going to

$$= 60 - (60 \times \frac{1}{4})$$

$$= 60 - (15 \times 3)$$

$$= 60 - 45$$

$$= 15 \text{ units.}$$

A.29. (C) Density of a cuboidal block =

A.30. (B) Explanation: Volume of

$$5 \text{ cm} \times 3 \text{ cm} \times 2 \text{ cm} = 30 \text{ cm}^3$$

Density of block = mass/volume

$$= 50 \text{ gm} / 30 \text{ cm}^3$$

$$= 5 \text{ gm} / \text{cm}^3$$

$\rho_{\text{block}} > \rho_{\text{liquid}}$ a liquid of density $\rho_{\text{B}} = 1.67 \text{ gm} / \text{cm}^3$

The cuboidal block will float in a liquid of density greater than $1.67 \text{ gm} / \text{cm}^3$. Hence option B is the correct answer.

A.31. (C) Explanation: Slaked lime is Calcium hydroxide. Alkalis are those substances that are placed in the first column of periodic table and are called Alkali metals.

A.32. (B) Explanation: All elements in the first column of periodic table are called Alkali metals. They are highly reactive and dissolve in water and give clear solution.

A.33. (A) Explanation: Acetone is completely soluble in distilled water. It is a colourless and transparent solution. Its molecular weight is given as 58.

A.34. (C) Explanation: Average atomic weight is possible only when,

$$\frac{16 \times 4 + 18 \times 1}{5} = \frac{82}{5} = 16.40$$

The ratio is 4:1

A.35. (B) Explanation:

Atomic weights are C = 12, Na = 23, O = 16

\therefore Molecular weight of Na_2CO_3 is

$$2 \times 23 + 1 \times 12 + 3 \times 16 = 106 \text{ u}$$

A.36. (A) Explanation: Mercury, bromine and gallium are liquids at room temperature (normal temperature). Iodine is in solid form at room temperature.

A.37. (D) Explanation: Burning Magnesium ribbon in air forms Magnesium oxide, which when dissolved in water forms Magnesium hydroxide, which is basic in nature. Red litmus turns blue and blue remains blue in base.

A.38. (D) Explanation: Copper, iron and lead are transition elements which show variable valency. Sodium is a normal element, it doesn't show variable valency.

A.39. (A) Explanation: Vinegar is acetic acid. Therefore, wrong pair is Vinegar — Carbonic acid

A.40. (A) Explanation: Molecular formula of glucose is $\text{C}_6\text{H}_{12}\text{O}_6$

\therefore Molecular weight of glucose

$$= 12 \times 6 + 1 \times 12 + 16 \times 6$$

$$= 72 + 12 + 96$$

$$= 180$$

\therefore 360 gm of glucose means two moles of the same.

\therefore One mole of glucose contains 6.022×10^{23} molecules

$$\therefore \text{Two moles of glucose contains } 2 \times 6.022 \times 10^{23}$$

$$\text{i.e. } 12.044 \times 10^{23} = 1.204 \times 10^{24} \text{ molecules}$$

A.41. (B) Explanation: There are 15 protons and 18 electrons

\therefore X has — 3 charge i.e. X^{-3}

\therefore X is an anion.

A.42. (B) Explanation:

Intermolecular forces are in the order

Element	Cl	Ar	K	Br	I
Number of protons	17	18	19	35	53
					11

Gas < Liquid < Solid

Sodium carbonate is an amorphous solid and therefore it has the strongest intermolecular force

A.43. (C)

A.44. (B) **Explanation:** Boiling points of given gases in liquid form

Gas	Neon	Nitrogen	Oxygen	Krypton
Boiling Point (°C)	-246	-196	-183	-152

A.45. (D) **Explanation:** The chemical name of $\text{Na}_2\text{S}_2\text{O}_3$ is Sodium thiosulphate.

A.46. (B) **Explanation:** Ammonia and hydrogen are lighter than air. Carbon dioxide and sulphur dioxide are heavier than air.

A.47. (C) **Explanation:** Oxide of X is X_2O_5

X has change + 5 i.e. X^{+5}

and Oxygen is bivalent i.e. O^{-2}

∴ Chloride of X has formula XC1_5 .

A.48. (C) **Explanation:** Reactivity decreases from (2, 1) to (2, 4)

Again increases from (2, 4) to (2, 7)

∴ Correct option is C.

A.49. (A) **J Explanation:**

$$C = (F - 32) \times \frac{5}{9}$$

$$\therefore 113^\circ\text{F} = 45^\circ\text{C} = (45 + 273) \text{K} = 318 \text{K}$$

A.50. (A) **Explanation:** Gun powder is the mixture of sulphur, potassium nitrate and charcoal.

A.51. (C) **Explanation:** Hard water contains sulphates, chlorides and bicarbonates of calcium and magnesium. Hence, calcium chloride, calcium sulphate and magnesium sulphate make water hard.

A.52. (C) **Explanation:** The rate of evaporation depends on change in surface

area, temperature, humidity and wind speed. It doesn't depend on change in - volume.

A.53. (A) **Explanation:** ^{131}I for treatment of goiter
 ^{235}U for production of energy

^{60}Co for treatment of cancer

A.54. (C) **Explanation:** Buckminster fuller (Fullerene) is an allotrope of Carbon.

A. 55. (B) **Explanation:** $\text{Mg}(\text{OH})_2$, i.e. Magnesium hydroxide is used as an antacid.

A.56. (D) **Explanation:** Strength of any acid depends on concentration of H^+ ions furnished by the acid.

A.57. (B) **Explanation:** $2\text{NaHCO}_3 + \text{H}_2\text{SO}_4 + \text{Na}_2\text{SO}_4 + \text{H}_2\text{O} + \text{CO}_2$.

∴ P is Na_2SO_4

A.58. (D) **Explanation:** Deposition of copper will take place anywhere on the surface of nail at the same time.

A.59. (B) **Explanation:** To blow a flame, more pressure is required. So, to increase the pressure of air passing out through mouth, we pucker out lips.

A.60. (C) **Explanation:** Capsaicin tastes pungent which is present in the chillies.

- | | |
|------------|------------|
| A. 61. (A) | A. 81 (B) |
| A. 62. (A) | A. 82 (C) |
| A. 63. (C) | A. 83 (B) |
| A. 64. (A) | A. 84 (B) |
| A. 65. (D) | A. 85 (D) |
| A. 66. (A) | A. 86 (C) |
| A. 67. (C) | A. 87 (A) |
| A. 68. (C) | A. 88 (B) |
| A. 69. (A) | A. 89 (C) |
| A. 70. (A) | A. 90 (D) |
| A. 71. (D) | A. 91 (C) |
| A. 72. (A) | A. 92 (A) |
| A. 73. (C) | A. 93 (C) |
| A. 74. (A) | A. 94 (D) |
| A. 75. (A) | A. 95 (B) |
| A. 76. (B) | A. 96 (B) |
| A. 77. (A) | A. 97 (C) |
| A. 78. (A) | A. 98 (D) |
| A. 79. (B) | A. 99 (D) |
| A. 80. (B) | A. 100 (A) |

dream.
believe.
do.
repeat.